AMM.com - Top Stories - Aug. 2, 2002

Solutions emerge for shredder 'fluff' dilemma

By Joseph McCann

PHILADELPHIA, Aug. 2 -- The benefits of automotive recycling have been evident for many years and may be expanding due to new ways of dealing with shredder "fluff," the often-troublesome nonmetallic parts of junked vehicles.

More than 11 million vehicles were recycled in the United States last year, making automobiles the most recycled consumer product in the country. The material provides steel mills with a substantial portion of their annual scrap feedstock, as well as paychecks for 40,000 workers in the scrap recycling and auto dismantling industries.

About 75 percent of every vehicle--much of it ferrous and nonferrous metals--can be reclaimed and reused. But as millions of autos head for the shredder each year, it's the other 25 percent that presents a problem for recyclers.

Shredder fluff, or automobile shredder residue (ASR), is a problematic byproduct of the automobile recycling industry. Once a vehicle passes through the shredding process and all the ferrous and nonferrous components have been removed, plastics, fabrics, glass and dirt remain. In most cases, the residue is either landfilled or incinerated.

Despite its harmless-sounding name, shredder fluff can be a potentially dangerous byproduct in the recovery process and present a host of problems for both the environment and local communities. Tests like those devised by the U.S. Environmental Protection Agency have found that ARS can contain hazardous metals and materials: arsenic, cadmium, chromium, lead, mercury and polychlorinated biphenyls (PCBs).

"Not every load of this material is tested, but a vast majority of it doesn't go as hazardous waste," said Scott Horne, director of government relations with the Institute of Scrap Recycling Industries (ISRI), Washington. "This material doesn't typically fail leach-water testing."

Furthermore, John Hayworth, ISRI director of environmental compliance, said that shredder fluff had to pass other independent hurdles before it was released into the waste stream. "Most of these shredders ship (fluff) to municipal landfills that have their own restrictions on hazardous waste and have to verify if the material is safe," he said. "So, they have to do their own testing, because they would be in violation of their contract to operate a landfill."

Today, landfilling is the most widely accepted method for the disposal of shredder fluff throughout the country. Although unwanted elsewhere, it has developed a useful purpose once it reaches the dump. At most modern landfills, operators have experimented with numerous substitutes for soil to reduce odors, prevent emissions and create a barrier against rodents. Trial-and-error tests determined that shredder fluff met all of the requirements and it has become a viable substitute for soil. Shredder fluff also provides greater traction for landfill machinery and erodes slower than dirt, but perhaps its greatest advantage over soil is its ability to absorb and retain dangerous elements.

Research conducted by the University of Minnesota revealed that shredder fluff did, indeed, contain lead contamination. But the research also found that it retained heavy metals--like lead--much longer than most other landfill coverings.

However, even though shredder fluff has found a useful application, few regard landfilling the material as a long-term solution to the problem. Automakers and trade associations are wrestling with the problem that others have tackled before. Most notable, perhaps, is the work at the Argonne National Laboratory in Illinois over the past 10 years.

Argonne recognized that eliminating shredder fluff altogether from future automobiles was an unrealistic goal. Instead, the lab developed an innovative device that could redefine shredder fluff's relationship with the shredding business. Three years ago, Argonne unveiled a two-stage, trommel-separation system for sorting shredder fluff into three distinct and valuable commodities: plastics, foam and iron oxides. The system, according to Argonne, allows shredder residue to be sold to processors for a modest profit rather than dumping the material.

One product of the process is polyurethane foam. Although contaminated by shredding, it is washed, cleaned and dried before it is baled and sold. Once primarily car seating and padding, it now becomes a cheap source of foam for the carpet industry in carpets or foam padding.

A froth-flotation stage of the Argonne process, designed outside of the Argonne Labs, is used to isolate plastics in shredder fluff. Much like foam, recovered plastics are baled and sold to the plastics recycling industry at a lower cost than virgin material.

Even some of the waste at the very end of the Argonne process can find a viable home in the marketplace. The material is subjected to magnetic separation to extract iron oxides for the cement industry.

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